

Serial No. 10/775,496  
Amendment dated May 16, 2006  
Reply to Office Action March 16, 2006

**Amendment to the Claims:**

The listing of claims will replace all prior versions, and listings of claims in the application.

**Listing of Claims:**

Claims 1, 2, and 3 (cancelled)

4. (currently amended) The concrete of claim 15 ~~[[3]]~~ wherein said coarse aggregate is defined as enriched limestone waste and is a processed by-product of the manufacture of crushed limestone of regular sizes, said process including washing and sizing this by-product, the physical properties of this coarse aggregate being in accordance with requirements of ASTM C33.

Claims 5, 6, 7, 8, and 9 (cancelled)

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Serial No. 10/775,496  
Amendment dated May 16, 2006  
Reply to Office Action March 16, 2006

10. (previously presented) The concrete of claim 4 with the coarse aggregate defined as enriched limestone waste wherein the compressive strength of said concrete is higher by at least 10% than that of concrete of the same consumption of cement with crushed limestone as a coarse aggregate of grading corresponding to the least size of coarse aggregate No. 89 to the largest size of fine aggregate No. 9 according to ASTM C33, respectively.

11. (currently amended) The concrete of claim 15 ~~[[3]]~~ with the coarse aggregate defined as enriched limestone waste wherein the compressive strength of said concrete is substantially as high or higher than that of concrete of the same consumption of cement and twice as high consumption of admixture with crushed granite of regular sizes as a coarse aggregate, while the flexural strength of this concrete is higher than that for concrete of the same consumption of cement with crushed granite of regular sizes as a coarse aggregate.

Serial No. 10/775,496  
Amendment dated May 16, 2006  
Reply to Office Action March 16, 2006

12. (currently amended) The concrete of claim 15 ~~[[3]]~~ wherein concrete mix design is determined by the value of 28-day modulus of rupture equal to the mean value of 28-day flexural strength according to Portland Cement Association Engineering Bulletin EB 109P, the mean value of flexural strength being estimated  $9.42\sqrt{f_{cr}'}$  where  $f_{cr}'$  is the mean value of 28-day compressive strength defined according to American Building Code ACI 318 as required average 28-day compressive strength and equal to  $f_{cr}' + 1.34s$  where  $f_{cr}'$  and  $s$  are specified compressive strength and standard deviation of this strength, respectively.

13. (original) The concrete of claim 12 wherein mix design corresponding to 28-day values of modulus of rupture (MR) equal to 550, 600, 650, 700, and 750 psi can be carried out according to the values corresponding to the 28-day values of specified compressive strength  $f_{cr}'$  equal to 3,000, 3,500, 4,000, 4,500, and 5,000 psi, respectively.

Claims 14 and 15 (cancelled)

Serial No. 10/775,496  
Amendment dated May 16, 2006  
Reply to Office Action March 16, 2006

16. (new) A concrete of specified compressive strength  $f_c'$  and modulus of rupture up to 5,000 psi and more than 750 psi, respectively, with small grains crushed limestone finer than 9.5 mm of grading intermediate between the least size of coarse aggregate No. 89 and largest size No. 9 of fine aggregate according to ASTM C33 as a coarse aggregate wherein:

the physical properties of this coarse aggregate are in accordance with requirements of ASTM C33;

the amount of said coarse aggregate finer than 4.75 mm is about two-thirds of the total weight of aggregate according to ASTM C33;

the amount of said coarse aggregate finer than 2.36 mm corresponding to the sieve No. 8 according to ASTM C33 does not exceed about 10% of the total weight of aggregate;

the amount of said coarse aggregate finer than 1.18 mm corresponding to the sieve No. 16 according to ASTM C33 does not exceed about 7% of the total weight of the aggregate;

the amount of said coarse aggregate finer than 300 $\mu$ m corresponding to the sieve No. 50 according to ASTM C33 does not exceed about 3.0% of the total weight of aggregate;

the share of cement per  $M^3$  of said concrete mix being in the range of 175 to 600 Kg per  $M^3$ ; the share of water per  $M^3$  of said concrete mix being in the range of

Serial No. 10/775,496  
Amendment dated May 16, 2006  
Reply to Office Action March 16, 2006

500 - 980 Kg per M<sup>3</sup> and the share of coarse aggregate being in the range of 1020 to 1150 Kg per M<sup>3</sup>.

17. (new) The concrete of claim 15 wherein the compressive strength is higher at least by 10% than that of concrete of same consumption of cement with crushed limestone as a coarse aggregate of grading corresponding to the size No. 89 and size No. 9, respectively.

18. (new) The concrete of claim 15 wherein the compressive strength of said concrete is substantially as high or higher than that of concrete of the same consumption of cement and twice as high or higher than that of concrete of the same consumption of cement and twice as high consumption of admixture with crushed granite of regular sizes No. 57 and No. 67 of nominal dimensions 25.0 to 4.75 mm and 19 to 4.75 mm, respectively, as a coarse aggregate, while the flexural strength of this concrete is higher than that for concrete of the same consumption of cement with crushed granite of said regular sizes as a coarse aggregate.

Serial No. 10/775,496  
Amendment dated May 16, 2006  
Reply to Office Action March 16, 2006

19. (new) The concrete of claim 15 of specified compressive strength  $f'_c$  in the range from 2,000 psi to 5,000 psi, cone Abrams slump of concrete mix as an index of the workability of said concrete mix without water-reducing admixture is in the range from 5 cm to 9 cm, the water/cement ratio of said concrete is in the range from 0.4 to 0.8, the amount of cement of compressive strength about 50 Mpa at the 28 day age is in the range from 270 - 600 Kg per  $M^3$  sand of fineness modulus equal to 2.0 as a fine aggregate is in the range from 500 to 800 Kg per  $M^3$ , water is in the range from 215 to 225 Kg per  $M^3$ . and said coarse aggregate is in the range from 1,020 to 1,040 Kg per  $M^3$ .

20. (new) The concrete of claim 15 of specified compressive strength  $f'_c$  in the range from 2,000 psi to 5,000 psi, cone Abrams slump of concrete mix as an index of the workability of said concrete mix with water-reducing admixture of mid-class is in the range from 5 cm to 9 cm, the water/cement ratio of said concrete mix is in the range from 0.4 to 0.8, the amount of cement of compressive strength about 50 Mpa at the 28 day age, water sand of fineness modulus equal to 2.0 as a fine aggregate, and said coarse aggregate in kilograms per cubic meter of concrete mix are in the ranges from 215 to 500, from 170 to 185, from 625 to 900, and from 1,080 to 1,120, respectively.

Serial No. 10/775,496  
Amendment dated May 16, 2006  
Reply to Office Action March 16, 2006

21. (new) The concrete of claim 15 of specified compressive strength  $f_c'$  in the range from 2,000 psi to 5,000 psi, concrete mix slump in the range from 5 cm to 9 cm as an index of the workability of said concrete mix with a plasticizer as admixture, and the water/cement ratio in the range from 0.8 to 0.4, the amounts of cement of compressive strength about 50 Mpa in the 28 day age, water, sand of fineness modulus equal to 2.0 as a fine aggregate, and said coarse aggregate in kilograms per cubic meter of fresh concrete mix are in the ranges from 175 to 420, from 140 to 155, from 720 to 980, and from 1,120 to 1,150, respectively.

22. (new) The concrete of claim 15 wherein concrete mix design is determined by the value of 28-day modulus rupture equal to the mean value of 28-day flexural strength according to Portland Cement Association Engineering Bulletin EB 109P, the mean value of flexural strength being estimated as  $9.42\sqrt{f_{cr}'}$  where  $f_{cr}'$  is the mean value of 28-day compressive strength defined according to American building code ACI 318 as required average 28-day compressive strength determined depending on the specified compressive strength  $f_c'$  and standard deviation of this strength, respectively, the estimation of 28-day modulus of rupture of concrete being the mean value of flexural strength corresponding to the mean value of compressive strength and the value of the specified compressive strength of this concrete  $f_c'$  taking into account the statistical connection between compressive and flexural strength of concrete mix

Serial No. 10/775,496  
Amendment dated May 16, 2006  
Reply to Office Action March 16, 2006

design of concrete of modulus of rupture of required value equal to the mean value of flexural strength of this concrete can be replaced by more convenient mix design of concrete of specified compressive strength  $f_c'$  corresponding to this value of modulus of rupture.

23. (new) The concrete of claim 22 wherein mix design corresponding to 28-day values of modulus of rupture (MR) equal to 550, 600, 650, 700, and 750 psi can be carried out according to the values corresponding to the 28-day values of specified compressive strength  $f_c'$  equal to 3,000, 3,500, 4,000, 4,500, and 5,000 psi, respectively.